



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Aharon Meir EYAL, et al  
Serial No.: 09/284,160 Group No.: 1621  
Filed: October 25, 1999 Examiner.: Taylor Victor Oh  
For: PROCESS FOR THE RECOVERY OF LACTIC ACID BY CONTACTING  
AQUEOUS SOLUTIONS CONTAINING THE SAME WITH A BASIC ORGANIC  
EXTRACTANT

Attorney Docket No.: U 012190-3

Assistant Commissioner for Patents  
Washington, D.C. 20231

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RESPONSE TO FINAL REJECTION

The Official Action of April 23, 2002 has been carefully considered and reconsideration of the application in view of the present submission is respectfully requested.

In paragraph 1 of the Office Action there is a rejection under 35 USC 103 which states in pertinent part: "Rejection of claims 19-34 under 35 USC 103(a) as being unpatentable over Worden et al (US 3,552,975) in view of Ting et al (US

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CLIFFORD J. MASS

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5,767,319)." However, neither of these references has been cited previously in the prosecution of this application. The next sentence of the Office Action states: "The rejection of Claims 19-34 under 35 USC 103(a) as being unpatentable over Baniel et al Worden et al (US 5,510,526) in view of Metz et al (US 4,282,385) is maintained for the reasons of the record in paper no. 6." The reference to "Worden et al" in this sentence appears to be out of context.

Applicants respectfully request clarification or correction of the grounds for rejection in view of the confused nature thereof. Applicants also respectfully submit that, if the application is not considered to be in allowable form in view of the comments provided below, the term for response should be restarted in accordance with the provisions of MPEP Sections 707.05(g) and 710.06 once the requested clarification or correction has been effected. Nevertheless, since Applicants suspect that the rejection was simply meant to be a repetition of the previous rejection, they respectfully respond by traversing the previous rejection over Baniel et al (U.S. 5,510,526) in view of Metz et al (U.S. 4,282,385) for the reasons set forth below.

To establish a *prima facie* case of obviousness, three basic criteria must be met: (a) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine reference teachings; (b) there must be a reasonable expectation of success; and (c) the prior art references when combined must teach or suggest all of the claim limitations (see MPEP Section 706.02(j)). The teaching or suggestion to make the

claimed combination and the reasonable expectation of success must both be found in the prior art and not based on an applicant's disclosure (Id). Applicants provide below a detailed explanation of why a proper understanding of the teachings of Baniel and Metz respectfully precludes a proper combination of these references in accordance with (a) above. First, Applicants respectfully traverse the reasons provided by the Examiner with respect to a reasonable expectation of success ((b) above) and an alleged teaching of all claim limitations ((c) above).

In the paragraph bridging pages 4 and 5 of the Official Action, the Examiner argues that the references provide a reasonable expectation of success in the claimed process by stating: "Therefore, it is **possible** that the combination of Baniel and Metz's process **could** be successful in an extraction from an aqueous solution containing free lactic acid in a defined amount by a **routine experimentation**" (emphasis added). It is respectfully submitted that this argument does not support the proposition that there is a reasonable expectation of success, and in fact would appear to support the opposite view. A possibility is not an expectation. Moreover, the need for experimentation to determine whether or not success may be achieved is a sign of unpredictability, not predictability. This is true whether or not the experimentation is routine or undue. (Applicants respectfully note that a distinction between routine experimentation and undue experimentation is one that is properly considered in a determination of whether a specification is enabling under the provisions of 35 USC 112, first paragraph, and not in a determination of whether there is a reasonable expectation of success to support a rejection under 35 USC 103.)

In the middle of page 5 of the Official Action, the Examiner does not refute the Applicants' argument that not all claim limitations are taught by the proposed combination of references, but simply states that "the argument is not directly related to the issues in the claims". This statement is respectfully not understood. Claim 19 of the application clearly and unequivocally sets forth in step (e) that the process involves "using said lactic acid-containing extractant from step (d), substantially as is, as said basic extractant in step (a)" and step (a) clearly recites "extracting at least 70% of the free lactic acid from said aqueous solution" wherein the aqueous solution is recited in the preamble as "containing free lactic acid and at least one lactate salt". Therefore, clearly Applicants argument is supported in the language of the claim. In the absence of a rebuttal to this argument, Applicants respectfully submit that the rejection should be withdrawn for this reason alone. (If the Examiner would be more amenable to allowing the claim if it specifically recited a ratio of free lactic acid and lactate salt, then applicants would consider the introduction of the definition and limitation of claim 20 into claim 19.)

In view of the above, Applicants respectfully submit that the Examiner has not established either of the criteria (b) and (c) discussed above. With respect to criterion (a) (suggestion or motivation to combine the references), the Examiner has stated at the end of several paragraphs that: "It would have been obvious for the skillful artisan in the art to have used the Metz's teaching the formation of hyperacid metal lactates in the Baniel et al's lactic acid recovery process." This basic premise upon which most of the rejections are based is respectfully traversed.

The Examiner has respectfully failed to consider and to give due cognizance to the fact that Baniel is starting with a fermentation solution which is a lactate solution. On the other hand, Metz is starting with a pure lactic acid solution to which he is adding a base to form hyperacid solid metal lactates in a lactic acid and lactate salt mixture. Conceptually these two inventions are diametrically opposite in that Baniel is starting with a lactate salt from which he wishes to obtain lactic acid while Metz is starting from a lactic acid solution which he wishes to partially convert to a salt.

Thus Metz is teaching the addition of calcium, hydroxide and calcium carbonate to a solution containing lactic acid to form a lactate salt and there is no reason why one would take the teachings of Metz and combine the same with Baniel considering the fact that Baniel is not starting with a solution containing lactic acid and is not interested in forming a salt since Baniel is interested in changing the salt inherent in the solution that is his starting material to lactic acid.

At this point, Applicants respectfully reiterate that the claimed invention is directed to solving the problem of extracting lactic acid from a solution which inherently contains both lactic acid and lactate salt and to recover the free acid and the acid values of the salt therefrom, as opposed to the solutions dealt with by Baniel which are lactate solutions.

Applicants also respectfully reiterate that the Baniel patent is starting with a lactate salt and is designed to obtain lactic acid therefrom, while Metz is starting with

a lactic acid which he wishes to partially convert to a salt.

In contradistinction, the claimed invention has solves the problem presented by the new strains of organisms which in fermentation produce a mixture of lactic acid and lactate salt as specifically explained in the last paragraph of page 4 of the specification wherein it is stated as follows: "Recently, new strains have been developed for lactic acid fermentation which can operate at slightly acidic conditions. It is expected that the fermentation pH will be further lowered on future development, probably at the cost of lowering the overall concentration in the solution. As long as the pH of the broth is  $>5$ , practically all of the product is still in the salt form.

**However, at a lower pH, a fraction of the lactic acid in the broth is not neutralized. Thus, at pH of 4.8 and 3.8, about 10% and about 50%, respectively, could be considered as being in free acid form."**

Thus, the state of the art was such that, since fermentation organisms were inhibited by low pH, a base was used to neutralize the acid as formed in order to keep the pH neutral and it was for this type of neutral solution containing lactate salts that Baniel proposed his process.

Metz on the other hand takes free acid and adds base.

In contradistinction to both of said patents, the starting solution which is being treated in the claimed process is a mixture of acid and salt since the solution being

treated is one produced by organisms which are more viable at low pH and therefore result in a starting solution which is a mixture of acid and base as explained hereinbefore and in the specification itself.

In the paragraph at the bottom of page 3, the Examiner has stated that the Metz reference is a secondary reference to supplement the primary reference as if a reference were required to teach that when you add a base to an acid in non-stoichiometric amounts there will result a mixture of an acid and a salt. Thus, basically this is the teaching of Metz as applied by the Examiner, and it is respectfully not understood how the combination of the teaching of Baniel combined with this teaching allows the Examiner to reach the conclusion found in lines 3-5 of page 4 of the Office Action that: "If the skillful artisan in the art had desired to make a high free lactic acid content, it would have been obvious for the skillful artisan in the art to have used the Metz's teaching the formation of hyperacid metal lactates in the Baniel et al's lactic acid recovery process." "A high free lactic acid content" in what? Baniel's starting material is a lactate salt and Metz's starting material is an acid. Therefore there is no point in Baniel's process at which one would logically insert Metz's teachings since Metz's teachings are not applicable to Baniel's process.

In the middle paragraph of page 4, the Examiner states that: "Baniel et al does emphasize that when the fermentation is carried out in the presence of calcium carbonate, it is possible to recover the lactic acid by acidification with sulfuric acid (see col. 1, lines 55-58)". This statement is also repeated in the last paragraph of page

4. The Examiner however has respectfully failed to take due cognizance of the fact that **this statement appears in Baniel's presentation of the prior art which he is trying to avoid.** More specifically, this statement is merely pointing out that, in the prior art, there was taught a process involving the addition of a strong acid such as sulfuric acid which displaces the lactic acid from its salt in the fermentation solution to form free lactic acid and gypsum as a by-product.

Therefore the fact that Baniel discusses the prior art fermentation in the presence of calcium carbonate and acidification with sulfuric acid does not mean that Baniel is teaching or suggesting the use thereof as can clearly be seen from a reading of the Baniel reference. Thus, this statement has is respectfully taken out of context and is not combinable with the teachings of Metz.

Referring to the argument bridging pages 4 and 5 of the Office Action, Applicants have already pointed out that the quote which the Examiner brings from the Baniel reference has nothing to do with Baniel's process and in fact relates to a reaction involving the formation of the insoluble salt gypsum which Baniel is trying to avoid. In addition, it is not seen how Metz can be combined with Baniel to teach the possibility of successful extraction of lactic acid from a mixture of lactic acid and lactate salt when neither reference is dealing with extraction of a lactic acid from a mixture of a lactic acid an a lactate salt.

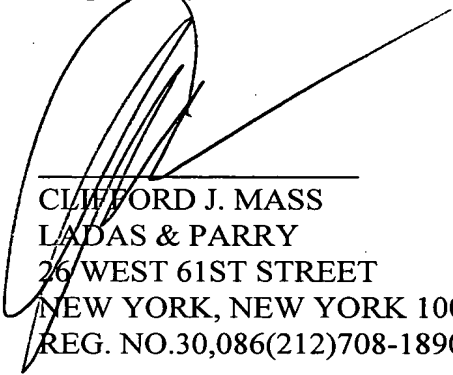
Even if one were to accept the argument that it might be obvious that one



could extract lactic acid from a mixture of lactic acid and lactate salt, the Examiner has respectfully not given due cognizance to the claim recitation: "extracting at least 70% of the free lactic acid from said aqueous solution". It is highly surprising that despite the buffering effect of the presence of the salt and acid in the starting solution and the presence of recycled lactic acid in the extractant, this process nevertheless succeeds in extracting at least 70% of the free lactic acid from said aqueous solution. Clearly, neither of the references alone or in combination suggest this surprising result such that there could not have been a reasonable expectation of success for the invention as claimed (see criterion (b), above).

For the above reasons, the rejections of record on the basis of Baniel in view of Metz are respectfully believed to be insufficient to set forth even a *prima facie* case of obviousness and, assuming these are the sole rejections of record, the application is respectfully believed to be in allowable form. An early notice of allowability is earnestly solicited and is believed to be fully warranted. Nevertheless, if the Examiner considers that a further claim amendment or discussion is warranted, he is respectfully invited to telephone the undersigned to discuss.

Respectfully submitted,



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